

see § 430.3). If the standby and off mode testing is conducted in a facility that is also used for testing cooling performance, maintain the outdoor test conditions either as required by section 4.2 of IEC 62301 or as described in section 3.1. If the unit is equipped with an outdoor air ventilation damper, close this damper during testing.

3.2.2 Power supply. Maintain power supply conditions specified in section 4.3 of IEC 62301 (incorporated by reference; see § 430.3). Use room air conditioner nameplate voltage and frequency as the basis for power supply conditions. Maintain power supply voltage waveform according to the requirements of section 4.4 of IEC 62301.

3.2.3 Watt meter. The watt meter used to measure standby mode and off mode power consumption of the room air conditioner shall have the resolution specified in section 4, paragraph 4.5 of IEC 62301 (incorporated by reference; see § 430.3). The watt meter shall also be able to record a “true” average power specified in section 5, paragraph 5.3.2(a) of IEC 62301.

4. Measurements.

4.1 Cooling mode. Measure the quantities delineated in section 5 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3).

4.2 Standby and off modes. Establish the testing conditions set forth in section 3.2. Prior to the initiation of the test measurements, the room air conditioner shall also be installed in accordance with section 5, paragraph 5.2 of IEC 62301 (incorporated by reference; see § 430.3). For room air conditioners that drop from a higher power state to a lower power state as discussed in section 5, paragraph 5.1, note 1 of IEC 62301, allow sufficient time for the room air conditioner to reach the lower power state before proceeding with the test measurement. Follow the test procedure specified in section 5, paragraph 5.3 of IEC 62301 for testing in each possible mode as described in 4.2.1 and 4.2.2, except allow the product to stabilize for 5 to 10 minutes and use an energy use measurement period of 5 minutes. For units in which power varies over a cycle, as described in section 5, paragraph 5.3.2 of IEC 62301, use the average power approach in paragraph 5.3.2(a).

4.2.1 If a room air conditioner has an inactive mode, as defined in 1.5, measure and record the average inactive mode power of the room air conditioner, P_{IA} , in watts.

4.2.2 If a room air conditioner has an off mode, as defined in 1.6, measure and record the average off mode power of the room air conditioner, P_{OFF} , in watts.

5. Calculations.

5.1 Calculate the cooling capacity (expressed in Btu/hr) as required in section 6.1 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3) and in accordance with ANSI/ASHRAE 16 (incorporated by reference; see § 430.3).

5.2 Determine the electrical power input (expressed in watts) as required by section 6.5 of ANSI/AHAM RAC-1 (incorporated by reference; see § 430.3) and in accordance with ANSI/ASHRAE 16 (incorporated by reference; see § 430.3).

5.3 Standby mode and off mode annual energy consumption. Calculate the standby mode and off mode annual energy consumption for room air conditioners, E_{TSO} , expressed in kilowatt-hours per year, according to the following:

$$E_{TSO} = [(P_{IA} \times S_{IA}) + (P_{OFF} \times S_{OFF})] \times K$$

Where:

P_{IA} = room air conditioner inactive mode power, in watts, as measured in section 4.2.1

P_{OFF} = room air conditioner off mode power, in watts, as measured in section 4.2.2.

If the room air conditioner has both inactive mode and off mode, S_{IA} and S_{OFF} both equal $5,115 \div 2 = 2,557.5$, where 5,115 is the total inactive and off mode annual hours;

If the room air conditioner has an inactive mode but no off mode, the inactive mode annual hours, S_{IA} , is equal to 5,115 and the off mode annual hours, S_{OFF} , is equal to 0;

If the room air conditioner has an off mode but no inactive mode, S_{IA} is equal to 0 and S_{OFF} is equal to S_{TOT} ;

$K = 0.001$ kWh/Wh conversion factor for watt-hours to kilowatt-hours.

[76 FR 1035, Jan. 6, 2011]

APPENDIX G TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF UNVENTED HOME HEATING EQUIPMENT

1. Testing conditions.

1.1 Installation.

1.1.1 Electric heater. Install heater according to manufacturer's instructions. Heaters shall be connected to an electrical supply circuit of nameplate voltage with a wattmeter installed in the circuit. The wattmeter shall have a maximum error not greater than one percent.

1.1.2 Unvented gas heater. Install heater according to manufacturer's instructions. Heaters shall be connected to a gas supply line with a gas displacement meter installed between the supply line and the heater according to manufacturer's specifications. The gas displacement meter shall have a maximum error not greater than one percent. Gas heaters with electrical auxiliaries shall be connected to an electrical supply circuit of nameplate voltage with a wattmeter installed in the circuit. The wattmeter shall have a maximum error not greater than one percent.

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1.1.3 *Unvented oil heater.* Install heater according to manufacturer's instructions. Oil heaters with electric auxiliaries shall be connected to an electrical supply circuit of nameplate voltage with a wattmeter installed in the circuit. The wattmeter shall have a maximum error not greater than one percent.

1.2 *Temperature regulating controls.* All temperature regulating controls shall be shorted out of the circuit or adjusted so that they will not operate during the test period.

1.3 *Fan controls.* All fan controls shall be set at the highest fan speed setting.

1.4 *Energy supply.*

1.4.1 *Electrical supply.* Supply power to the heater within one percent of the nameplate voltage.

1.4.2 *Natural gas supply.* For an unvented gas heater utilizing natural gas, maintain the gas supply to the heater with a normal inlet test pressure immediately ahead of all controls at 7 to 10 inches of water column. The regulator outlet pressure at normal supply test pressure shall be approximately that recommended by the manufacturer. The natural gas supplied should have a higher heating value within ± 5 percent of 1,025 Btu's per standard cubic foot. Determine the higher heating value, in Btu's per standard cubic foot, for the natural gas to be used in the test, with an error no greater than one percent. Alternatively, the test can be conducted using "bottled" natural gas of a higher heating value within ± 5 percent of 1,025 Btu's per standard cubic foot as long as the actual higher heating value of the bottled natural gas has been determined with an error no greater than one percent as certified by the supplier.

1.4.3 *Propane gas supply.* For an unvented gas heater utilizing propane, maintain the gas supply to the heater with a normal inlet test pressure immediately ahead of all controls at 11 to 13 inches of water column. The regulator outlet pressure at normal supply test pressure shall be that recommended by the manufacturer. The propane supplied should have a higher heating value of within ± 5 percent of 2,500 Btu's per standard cubic foot. Determine the higher heating value in Btu's per standard foot, for the propane to be used in the test, with an error no greater than one percent. Alternatively, the test can be conducted using "bottled" propane of a higher heating value within ± 5 percent of 2,500 Btu's per standard cubic foot as long as the actual higher heating value of the bottled propane has been determined with an error no greater than one percent as certified by the supplier.

1.4.4 *Oil supply.* For an unvented oil heater utilizing kerosene, determine the higher heating value in Btu's per gallon with an error no greater than one percent. Alternatively, the test can be conducted using a tested fuel of a higher heating value within

± 5 percent of 137,400 Btu's per gallon as long as the actual higher heating value of the tested fuel has been determined with an error no greater than one percent as certified by the supplier.

1.5 *Energy flow instrumentation.* Install one or more energy flow instruments which measure, as appropriate and with an error no greater than one percent, the quantity of electrical energy, natural gas, propane gas, or oil supplied to the heater.

2. *Testing and measurements.*

2.1 *Electric power measurement.* Establish the test conditions set forth in section 1 of this appendix. Allow an electric heater to warm up for at least five minutes before recording the maximum electric power measurement from the wattmeter. Record the maximum electric power (P_E) expressed in kilowatts.

Allow the auxiliary electrical system of a forced air unvented gas, propane, or oil heater to operate for at least five minutes before recording the maximum auxiliary electric power measurement from the wattmeter. Record the maximum auxiliary electric power (P_A) expressed in kilowatts.

2.2 *Natural gas, propane, and oil measurement.* Establish the test conditions as set forth in section 1 of this appendix. A natural gas, propane, or oil heater shall be operated for one hour. Using either the nameplate rating or the energy flow instrumentation set forth in section 1.5 of this appendix and the fuel supply rating set forth in sections 1.4.2, 1.4.3, or 1.4.4 of this appendix, as appropriate, determine the maximum fuel input (P_F) of the heater under test in Btu's per hour. The energy flow instrumentation shall measure the maximum fuel input with an error no greater than one percent.

3. *Calculations.*

3.1 *Annual energy consumption for primary electric heaters.* For primary electric heaters, calculate the annual energy consumption (E_E) expressed in kilowatt-hours per year and defined as:

$$E_E = 2080(0.77)DHR$$

where:

2080=national average annual heating load hours

0.77=adjustment factor

DHR=design heating requirement and is equal to $P_E/1.2$ in kilowatts.

P_E =as defined in 2.1 of this appendix

1.2=typical oversizing factor for primary electric heaters

3.2 *Annual energy consumption for primary electric heaters by geographic region of the United States.* For primary electric heaters, calculate the annual energy consumption by geographic region of the United States (E_R)

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expressed in kilowatt-hours per year and defined as:

$$E_R = HLH(0.77) \text{ (DHR)}$$

where:

HLH=heating load hours for a specific region determined from Figure 1 of this appendix in hours

0.77=as defined in 3.1 of this appendix

DHR=as defined in 3.1 of this appendix

3.3 *Rated output for electric heaters.* Calculate the rated output (Q_{out}) for electric heaters, expressed in Btu's per hour, and defined as:

$$Q_{out} = P_E \text{ (3,412 Btu/kWh)}$$

where:

P_E =as defined in 2.1 of this appendix

3.4 *Rated output for unvented heaters using either natural gas, propane, or oil.* For unvented heaters using either natural gas, propane, or oil equipped without auxiliary electrical systems, the rated output (Q_{out}), expressed in Btu's per hour, is equal to P_F , as determined in section 2.2 of this appendix.

For unvented heaters using either natural gas, propane, or oil equipped with auxiliary electrical systems, calculate the rated output (Q_{out}), expressed in Btu's per hour, and defined as:

$$Q_{out} = P_F + P_A \text{ (3,412 Btu/kWh)}$$

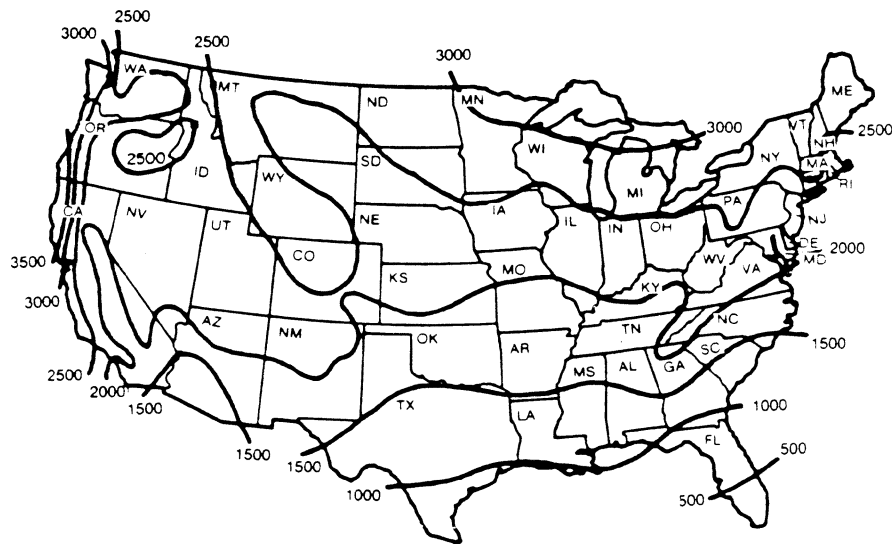
where:

P_F =as defined in 2.2 of this appendix in Btu/hr

P_A =as defined in 2.1 of this appendix in Btu/hr

FIGURE I

Heating Load Hours (HLH) for the United States and Territories



This map is reasonably accurate for most parts of the United States but is necessarily highly generalized and consequently not too accurate in mountainous regions, particularly in the Rockies

Alaska — 3500 HLH
Hawaii and Territories — 0 HLH

(Energy Policy and Conservation Act, Pub. L. 94-163, as amended by Pub. L. 94-385; Federal Energy Administration Act of 1974, Pub. L. 93-275, as amended by Pub. L. 94-385; Department of Energy Organization Act, Pub. L. 95-91; E.O. 11790, 39 FR 23185)

[43 FR 20132, May 10, 1978. Redesignated and amended at 44 FR 37938, June 29, 1979; 49 FR 12157, Mar. 28, 1984]

APPENDIX H TO SUBPART B OF PART 430 [RESERVED]

APPENDIX I TO SUBPART B OF PART 430— UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF CONVENTIONAL RANGES, CONVENTIONAL COOKING TOPS, CONVENTIONAL OVENS, AND MICROWAVE OVENS

NOTE: The procedures and calculations in this appendix need not be performed to determine compliance with energy conservation standards for conventional ranges, con-

ventional cooking tops, conventional ovens, and microwave ovens at this time. However, any representation related to standby mode and off mode energy consumption of these products made after September 6, 2011 must be based upon results generated under this test procedure, consistent with the requirements of 42 U.S.C. 6293(c)(2). After July 1, 2010, however, when DOE adopts an energy conservation standard that incorporates standby mode and off mode energy consumption, and upon the compliance date for such standards, compliance with the applicable provisions of this test procedure will also be required. Future revisions may add relevant